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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,378	12/21/2001	Jing-Pei Chou	000761/P11	8194

32588 7590 11/05/2003

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER	
PADGETT, MARIANNE L	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/026,378	Chan et al
Examiner	**Group Art Unit**
M. L. Padgett	1762

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on _____.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-73 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-73 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 7(5/9/03) ☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892 ☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948 ☐ Other _____

Office Action Summary

1. Claims 1-73 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant's cite Lu (PN 6,017,818) as using TiSiN throughout (actually Lu writes "Ti-Si-N" which is not standard chemical formula configuration and need not be stoichiometric, also its NOT what applicants use), but fail to point out a definition or explanation therein that answers the concerns raised by the examiner, hence it remains unclear whether applicants intend "TiSiN" which is written as a chemical formula to actually be one, as it appears to not exist as a compound in the presently claimed stoichiometry. A clear unambiguous statement of meaning on the record by applicants is needed.

In claim 15, while the examiner assumes that in the amended step (d) "treatment process" is intended to refer to step "(c) treating...", the present claim language does not actually necessitate that, so it is uncertain or not positively claimed that the "removing..." of step (d) is occurring during (c). Clear wording to the assumed effect, would be --during said treating of titanium nitride...--

Other 112 problems discussed in section 1 of paper No. 6, mailed April 14, 2003 appear to be corrected.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-9, 26-34, 40-45 and 62-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu (6,017,818), in view of Sivaram (Chem. Vap. Dep.: Thermal & Plasma Dep. of Electronic Mat.), as discussed in section 3 of paper No. 6, mailed 4/14/03.

Applicant's arguments do not refute that by-product removal is a normal part of the CVD process, as discussed in paper #6, nor the asserted obviousness of the reaction with or without Sivaram. Applicant's arguments that Lu is a different method as it uses an annealing process is not convincing, as their claims do not exclude such, in fact they may be considered to be explicitly inclusive of annealing, since applicant also has dependent claims with post-treatments that could be called annealing. It is also noted that the European patent office considers claims

40, 42, 62 and 64-65 to be completely anticipated, without any qualifications, and applicants arguments do not appear anymore relevant to these claims than they do to the (narrower) claim 1 given as representative.

4. Claims 10-25, 35-39, and 46-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Sivaram as applied to claims 1-9, 26-34, 40-45 and 62-67 above, and further in view of Kim et al (GB 2,299,345A) or Sandhu (5,576,071) or Foster et al (5,567,483) applied in section 4 of paper No. 6.

Applicant's arguments that the ternary references are completely different is not convincing, as they provide no support for why organometallic precursors used in depositing TiN by a CVD reaction is completely different from exactly the same thing! Therefore, exposure to taught H-plasmas for post-deposition treating before the Si exposure forms Ti-Si-N, remains obvious as previously discussed. Note none of applicants' independent claims require any specific precursor for the initial TiN, and while Lu prefers TDMAT, he recognizes the use of $TiCl_4$ + NH_3 for analogous depositions in the prior art, thus relating to the various ternary references reactions, as discussed in paper #6.

5. Claims 1-6, 26-28, and 30-32 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yi et al (WO 00/16377).

It is noted that Yi et al's publication date (March 23, 2000) is before applicant's filing date of December 21, 2001, by more than a year, however it is after the filing dates of the CIP parent applications, hence for any claims that ALL aspects of those claims can be shown to be supported in CIP parents, Yi et al will not be prior art.

In Yi et al, see the abstract; Figures, especially 1A; claims, esp.1A; claims, especially 1, 2, 6, 9, 11, 16-18; page 3, line 23-32; and page 4, line 28- page 5, line 16.

6. The article to Min et al is analogous to Yi et al, but restricted to organometallics, instead of also including halogenated metal (Ti) compounds. Note it is dated in April of 1999 has analogous considerations.

7. Claims 1-4, 6-7, 10-14, 26-28, 31-32, 35-38 are rejected under 35 U.S.C. 102(b(?)) as being clearly anticipated by Levine et al (5,989,999).

The cited patent to Levine has overlapping inventor, same assignee, but different claimed materials. This reference can be removed by showing support in CIP parents if present, and that differing inventors did not invent portions presently claimed. See Figure 49, front-page figure; column 13, line 53- column 14, line 35; column 15, line 15- column 16, line 67.

8. Applicant's arguments filed July 11, 2003 and discussed above have been fully considered but they are not persuasive. Note new art rejection is over art supplied by applicant.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336 or (571) 272-1425 after mid December. The examiner can generally be reached on Monday-Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9306 (all regular).

M.L. Padgett/dh
October 27, 2003

November 4, 2003

MARIANNE PADGETT
PRIMARY EXAMINER